BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 9, 2005

Re: Public Hearing to Consider Approval of Report on 2001 Ozone Attainment Plan Further Study Measure 9: Refinery Wastewater Treatment Systems

RECOMMENDED ACTION:

Approve staff recommendation that no regulatory amendments are necessary at this time.

BACKGROUND

The District committed in its Revised San Francisco Bay Area 2001 Ozone Attainment Plan to examine whether controls on uncontrolled components of a petroleum refinery's wastewater system would reduce VOC emissions significantly at each of the Bay Area five refineries. The District, jointly with the California Air Resources Board (CARB), undertook a two-phased study to investigate the wastewater collection and treatment systems components (Further Study Measure 9: Refinery Wastewater Treatment Systems). The District completed the first phase of the study in 2004 and proposed amendments to Regulation 8, Rule 8: Wastewater Collection and Separation Systems that the Board adopted in September, 2004. The amendments reduce VOC emissions by 2.1 tons per day (tpd). The District has now completed the second phase of Further Study Measure 9, an investigation of whether there are potential VOC emissions reductions to be gained from the refineries' secondary wastewater treatment components. The secondary wastewater treatment components treat wastewater either using chemical and/or biological methods to separate the organics from the water prior to discharge into San Francisco Bay Area waters.

Since the beginning of this study, the District and CARB have invited representatives from the five Bay Area petroleum refineries, the Western States Petroleum Association (WSPA), the Regional Water Quality Control Board, Communities for a Better Environment (CBE), and outside environmental consultants to participate in technical working group meetings. Staff convened four working group meetings in 2005 to discuss the Phase Two Work Plan, proposed emissions models, sampling plan and methodology, and the control technologies and associated costs. In addition, the District held a Public Workshop on October 27, 2005 to solicit comments from the public on the District's recommendation not to amend the existing regulation.

DISCUSSION

To estimate the emissions, the District and CARB conducted a field investigation to collect direct vapor measurements and wastewater samples from processes located at two refineries. The field-collected data were used in addition to refinery-specific process information to develop individual refinery-specific emission models. The District ran the model for each refinery and calculated potential emissions from each secondary treatment unit at each refinery.

The estimated emissions are as follows:

- A total of 0.24 tons per day (tpd) of VOC emissions was estimated from all units studied at the refineries;
- For Shell, Chevron, Tesoro, and Valero refineries, all of the emissions were produced from the biological treatment unit;
- Uncontrolled process units (i.e., equalization ponds and clarifiers) that followed the biological treatment unit had negligible emissions; and
- ConocoPhillips had VOC emissions of 0.11 tpd from an open channel and Dissolved Air Floatation (DAF) unit vents.

The District evaluated three reliable and proven control technologies (i.e., steam stripper, liquid phase carbon adsorption unit, and doming tanks) known to reduce VOC emissions from refinery wastewater streams. For either a steam stripper or a liquid phase carbon adsorption unit, it would cost from $1.35 million to $1.42 million per ton to remove 0.14 tons of VOC per day. Only two refineries could dome (enclose) their treatment tanks. The doming would cost $25,000 per ton removed, not including costs of abating the emissions, but reduce VOC emissions by only 0.025 tpd. District staff has concluded that additional amendments to Regulation 8, Rule 8 are not viable measure to address ozone at this time.

ISSUES

The Workshop staff report was available for public review on September 27, 2004 and a public workshop was held in Martinez on October 27, 2005. The core issues raised during a technical workgroup meeting and public workshop concerned additional expenses and effectiveness of installing the control technologies, recommendation for monitoring effluent flowing into the biological treatment units, consideration of additional factors for determining feasibility of implementing controls at ConocoPhillips, and consideration of pollution prevention strategies as a cost-effective control for reducing VOC emissions. Staff considered these comments and made changes to the Draft Staff Report, as appropriate. A summary of the outstanding issues and responses is presented below:

Required Monitoring: Communities for a Better Environment (CBE) proposed that the District amend Regulation 8, Rule 8 to require monitoring of the wastewater entering the wastewater treatment systems to determine whether the new controls required on upstream collection components by the September 2004 amendments will increase hydrocarbon concentrations in the downstream treatment systems. District and CARB staff have estimated that hydrocarbon concentrations at the separators would increase from less than <0.5% to 16%, depending on the refinery. This incremental increase is within the natural variation seen during normal operations. Consequently, a requirement for additional monitoring of the effluent into the biological treatment units is not warranted. However, the District may use its

existing authority to sample, source test, or periodically monitor hydrocarbon concentrations at any of refineries' wastewater systems.

Feasibility of Implementing Controls at ConocoPhillips: CBE commented that the feasibility of implementing controls has not been evaluated adequately for ConocoPhillips. Although their emissions of 0.11 tpd are over 45% of all emissions from wastewater treatment systems, and staff has evaluated control technologies, staff does not believe that a regulatory amendment is necessary for one facility. ConocoPhillips is cooperating with the District to discuss possible controls.

Pollution Prevention Strategies: CBE commented that District staff did not evaluate the feasibility and cost-effectiveness of reducing VOC emissions through operational changes by implementing pollution prevention controls. Potential pollution prevention strategies designed to reduce the VOC concentrations entering the collection systems were discussed in the phase one staff report. The option of implementing pollution prevention strategies to control wastewater collection system components is included in Regulation 8, Rule 8. As noted by CBE, some of the refineries have implemented such programs in order to comply with the September 15, 2004 amendments. Any reductions of VOCs entering the wastewater stream at the collection system will reduce VOCs at the treatment systems. No additional pollution prevention strategies are available that would solely be applicable to the treatment systems without impacting, at the outset, the collection and separation systems. Consequently, no additional pollution prevention programs were discussed in the phase two staff report.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

None

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

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Approved by: Henry Hilken

Attachment:

Staff Report for Further Study Measure 9: Refinery Wastewater Treatment Systems